

15¢

\$5.50 A YEAR

March 7, 1959

VOL. 75 NO. 10

PAGES 145-160

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

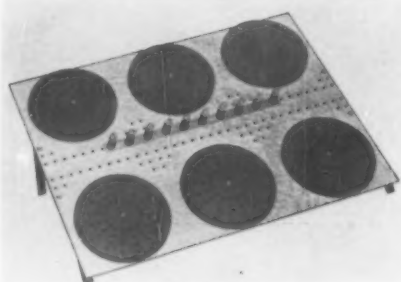


"Counting" a Winner

See Page 150

A SCIENCE SERVICE PUBLICATION

# Why have hundreds of schools bought



## GENIAC<sup>®</sup>

### The *ELECTRIC BRAIN* Construction Kit?

Because GENIAC is the only kit and text combination that presents the basic ideas of cybernetics, boolean algebra, symbolic logic and computer circuitry so simply that a twelve year old can construct what will still fascinate advanced students!

The partial list of our institutional purchasers below indicates a cross section of our customers. GENIAC is not only an excellent classroom demonstrator but it provides hours of fun abuilding. As such it makes a perfect present for the science minded teen-ager. As a father-son project it can't be beaten.

GENIAC is sold to all customers on a one-week return guarantee. You may actually use it in that time, returning it as is if you decide not to keep it.

**Order yours now—only \$19.95**

Some of the 125 GENIACS you can build from the completely detailed instruction manual are:

LOGIC MACHINES: Comparing; Reasoning; Syllogism Machine; Intelligence Tester.

GAME PLAYING MACHINES: Tic-Tac-Toe; Nim (Think you can beat the machine?).

ARITHMETICAL MACHINES (Binary and Decimal): Adder; Subtractor; Multiplier; Divider; Arithmetical Carrying.

CODE MACHINES: Secret Coder; Secret Decoder; Combination Locks.

SIMPLE MACHINES: Burglar Alarm; Automatic Oil Furnace Circuit.

PUZZLE SOLVERS: The Space Ship Airlock; The Fox, the Hen, the Hired Man and the Corn; The Uranium Shipment and the Space Pirates.

ACTUARIAL: Douglas MacDonald's Will.

SPECIAL: Machine to Compose Music, Machine to Forecast the Weather.

GENIAC parts are specially manufactured to high tolerance; they include a special six-deck switch of unique design and over 400 components plus a book "GENIACS: SIMPLE ELECTRICAL BRAIN MACHINES AND HOW TO MAKE THEM", plus six other books and manuals, parts tray and rack, shown in picture above. GENIAC is a remarkable buy for

**only \$19.95**

Kit and instructions are returnable for full refund in seven days. This is a perfect father-and-son project; your whole family and your friends will enjoy the finished machines. You can design new computers from the adaptable parts.

-----MAIL THIS COUPON-----

SCIENCE KITS, Dept. SL-39-A, Oliver Garfield Co., Inc., 108 East 16th St., N. Y. 3, N. Y.

Please send me:

1 GENIAC Electric Brain Construction Kit and Manual.

\$19.95 (East of Mississippi) \_\_\_\_\_

\$20.95 (Elsewhere in United States) \_\_\_\_\_

\$21.95 (Outside the United States) \_\_\_\_\_

Returnable in seven days for full refund if not satisfied. I enclose \$\_\_\_\_\_ in full payment. (For delivery in N. Y. City please add 3% for city sales tax.)

My name and address are attached.

#### SOME FIRMS AND INSTITUTIONS THAT HAVE ORDERED GENIAC:

Allis-Chalmers  
Remington-Rand  
International Business Machines  
Wheelindex Mfg. Co.  
Manuel Missionary College  
Walter V. Clarke Associates  
Barnard College  
Westinghouse Electric  
Phillips Laboratories  
General Insurance Co. of America  
Lafayette Radio  
Rohr Aircraft Co.  
Southwest Missouri State College  
Fibreglas Corp.  
Stamford Research Institute  
The Hecht Co.  
American Management Assoc.  
De Pauw University Hydro Electric Tower  
Adams State Teachers College  
Abercrombie and Fitch  
Kleinschmidt Laboratories  
Kansas State Teachers College  
Albert Einstein Medical College  
Naval Research Laboratories  
Board of Education, Tecumseh, Nebraska  
Marshfield Public Schools  
Los Angeles Public Schools  
Jefferson Union High School  
Oklahoma A&M  
Kansas City University  
Duke University  
Coral Gables Senior High School  
Courtland Jr. High School  
Bell Telephone Laboratories  
Lovell Public Schools  
Clearwater High School  
St. John's Seminary  
Orange County Community College  
Morningside College  
New Hampshire Public School  
Kentucky Wesleyan College  
University of Ottawa  
... and hundreds of other individuals  
and institutions

## ASTRONOMY

# Image Converter Used

Telescopes in Flagstaff, Ariz., test simple device that photographs stars electronically. Scientists are now checking an improved version of the device.

➤ A SIMPLE DEVICE to photograph stars electronically has been used successfully on telescopes in Flagstaff, Ariz.

An improved version is being tested by scientists at the Carnegie Institution in Washington. Called an image converter, the device will be shipped to Flagstaff soon for making stellar and planetary photographs on an experimental basis.

The image converter, developed and built by Radio Corporation of America, has military as well as astronomical applications. It is also being tested by physicists at the University of Michigan and elsewhere for photographing the path of high-energy nuclear particles passing through a scintillation counter.

Dr. W. K. Ford Jr. of Carnegie told SCIENCE SERVICE that the improved image converter represents about a half-way point in the astronomers' goal of electronically amplifying starlight.

The eventual aim is to make a 20-inch telescope the equivalent of a 200-inch for some purposes. The device does not require auxiliary vacuum equipment as does the

thin-film type of image converter, which is also under development.

In view of the discoveries made during the last 50 years with large telescopes, routine use of image converters, when perfected, may bring discoveries requiring mankind to reconsider the universe.

The RCA image converter is a six-inch-long tube that receives the starlight at one end, which is attached to the eyepiece of the telescope. The light is then intensified internally by electronic means and displayed at the other end where it can be photographed.

The tube has been used on both the U. S. Naval Observatory's 40-inch reflector and Lowell Observatory's 24-inch refractor. On the 40-inch, an exposure time of only two minutes allowed photographing stars of the 18th magnitude. Direct photographs of the same region showed stars of only 16.5 magnitudes.

The light gain of the RCA image converter is actually considerably greater than these figures would indicate. One of the problems, graininess of the phosphor film, is now believed licked.

When used on the 24-inch telescope, the same type of tube gave successful images of Mars in a three-hundredth of a second, one-tenth of the usual exposure time. However, no clearer details were seen than with direct photography, it is reported in *Sky and Telescope* (March).

The continuing experiments with image converters are being conducted by Drs. Ford and M. A. Tuve, director of Carnegie's Department of Terrestrial Magnetism, John S. Hall, director of Lowell Observatory, and William A. Baum of Mount Wilson and Palomar Observatories, operated jointly by Carnegie and California Institute of Technology.

Science News Letter, March 7, 1959

## TECHNOLOGY

## Computer Gives Orders To Automatic Machines

➤ A LONG STEP forward in the automatic control of machines was seen in development of a method for preparing the necessary instructions with an electronic computer.

The system, known as APT for Automatically Programmed Tool, can increase the productive capacity of all U. S. industries. Using it, a high-speed digital computer can calculate the numerical information necessary to determine the motions an automatically controlled machine must make in cutting metal parts for aircraft, missiles or other products.

Key to the system is a relatively simple, English-like language with which a human operator can communicate descriptions of the required parts and how they should be cut directly to the giant computer.

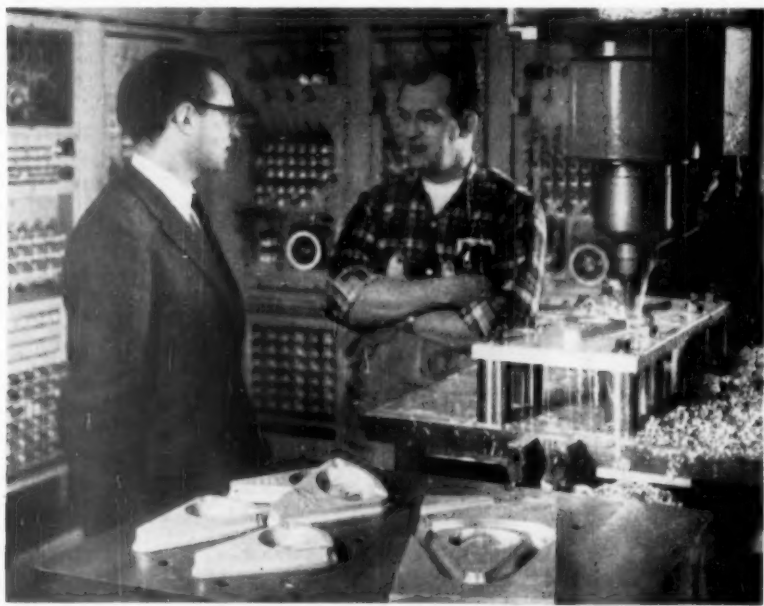
The language, designed primarily for convenience of humans, can be translated and understood by the computer. It permits those with no knowledge of computers to control complex calculations and is placed in a general purpose computer's "memory" by way of punched cards.

Numerical control for automatic machine tools has now been adopted by many plants throughout the country, but a bottleneck developed in preparing instructions for such tools. APT is aimed at solving this problem.

The system allows a designer to conceive a part, turn over his rough sketches to a draftsman who makes a detailed drawing. An outline of the general machining sequence to be followed by the cutting tool is then made by a programmer in the APT language. When fed into a computer with APT instructions in its "memory," the directions are transformed into the numerous detailed instructions required to produce the part by an automatically controlled machine.

The APT system was developed at the Massachusetts Institute of Technology Servomechanisms Laboratory, Cambridge, Mass., in research sponsored by the Air Force's Air Materiel Command. An industrial version of the method was produced for 19 aircraft plants. Future development to improve and expand the system will be under direction of the Aircraft Industries Ass'n.

Science News Letter, March 7, 1959



**AUTOMATIC CONTROL**—The milling machine above is cutting out a metal part under the APT system while two members of M.I.T.'s Servomechanisms Laboratory chat in the background. Clarence Feldmann, left, research assistant, and Gordon Phinney, machinist, have no need to check the machine as it follows its prescribed course which has been automatically planned by a digital computer. Pieces in the foreground have already been turned out by the machine.

## OPTICAL BARGAINS

See the Stars, Moon, Planets Close Up!  
3" REFLECTING TELESCOPE  
60 to 160 Power—An Unusual Buy!



Famous Mt. Palomar Type  
Assembled—ready to use  
You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Aluminum and over-coated 3" diameter high-speed f/10 mirror. Equatorial mount with lock on both axes. An Optical Finder Telescope, always so essential, is also included. Low cost accessory eyepieces available for higher powers. Sturdy, hardwood, portable tripod. Free with scope—valuable star chart and 272 page "Astronomy Book." Order by Stock No. Send check or M.O.—Money-back guarantee!  
Stock No. 85-050-Q.....\$29.95 Postpaid

### 4 1/4" ASTRONOMICAL TELESCOPE Up to 270X

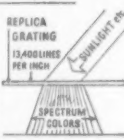


Mt. Palomar type. Up to 270 Power. A fine Reflector Telescope complete with real Equatorial Mount and Tripod and 6X Finder. Aluminum tube, 4 1/4" dia. mirror, rack and pinion focusing eyepiece holder, 2 eyepieces and mounted Barlow Lens for 40X, 90X, 120X and 270X. Low cost accessory eyepieces available for higher powers. Shipping wt. approx 25 lbs.  
Stock No. 85-008-Q, complete, \$74.50 f.o.b. Barrington, N. J.

### REPLICA GRATING Low, Low Cost

Take Unusual Color Photos at Night!

It's there—after decades of effort. Replica Grating—on film—at very low price. Breaks up white light into full spectrum colors. An exciting display. 18,400 lines per inch. Diffraction Grating has been used to answer more questions about the structure of the material world and the universe than any other single device. Use it for making spectroscopes, for experiments, as a fascinating novelty. First time available such large size—so cheaply. Comes in clear plastic protector.  
Stock No. 80,202-Q... Includes 2 pieces 8" x 5 1/2", 1 transmission type, 1 reflecting type \$2.00 Postd.  
Stock No. 80,180-Q... 1 piece transmission type 8" x 6" \$5.95 Postd.  
Stock No. 80,203-Q... 1 piece reflecting type 8" x 6" \$10.55 Postd.

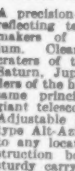


ERECT IMAGE LOW POWER MICROSCOPE  
BX. 10X, 20X  
\$90 Value—Only \$19.95. Extremely sturdy with rack and pinion focusing, color corrected optics, turnable microscope body for inclined viewing, three different powers, long working distance under objective, sufficient eye relief for easy viewing. Made from war surplus optical instrument so that you actually get \$80.00 value. Weighs 4 lbs. 15" high. 10-DAY FREE TRIAL! Accessory objectives available for powers of 15X, 30X, 40X.  
Stock No. 70,172-Q.....\$19.95 Postpaid



SPITZ MOONSCOPE  
A precision-made 45 power reflecting telescope—by the makers of Spitz Planetarium. Clearly reveals the craters of the moon, shows Saturn, Jupiter, other wonders of the heavens. Based on same principles as world's giant telescopes. Stands 36" high on removable lens. Adjustable 3" polished and corrected mirror. Fork type Alt-Azimuth rotates on full 360° circle—swings to any location in the sky. Fascinating 18-page instruction book is included. Instrument packed in sturdy carrying case.  
Stock No. 70,068-Q.....\$14.95 Postpaid

### TWO-STAGE ROCKET TOY—



Simple, safe—demonstrates principles of jet rockets. Uses water and air as fuel. First stage soars up 200 to 300 ft.—then 2nd stage is automatically released, going still higher. A 2nd stage satellite is also included and may be substituted. Made of Butyrate plastic. Set includes fuel supply tank and air injection pump.  
Stock No. 70,157-Q.....\$2.98 postpd.

### FREE CATALOG-Q

Yours for the Asking

America's No. 1 source of supply for experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, satellite scopes, binoculars, infrared superscopes. Items for making "Science Fair" projects, etc. Request Catalog-Q. Order by Stock No.—Send Check Satisfaction Guaranteed



EDMUND SCIENTIFIC CO.  
BARRINGTON, NEW JERSEY

## INVENTION

### Petroleum Prospectors Ask Bacteria, Then Drill

► OIL PROSPECTORS are consulting with natural-born experts, a family of bacteria, before gambling on expensive rigs and drilling operations.

Use of the oil-consuming bacteria is the basis of an invention for which James Maddox Jr., Bellaire, Texas, was awarded patent No. 2,875,135. He assigned rights to The Texas Company, New York City.

The invention takes advantage of the fact that certain bacteria, which consume hydrocarbons contained in petroleum, are found in unusual numbers in the soil over subsurface oil deposits. This is how it works:

Soil samples are mixed with known amounts of a hydrocarbon, then incubated. The mixture is allowed to stand quietly for one to three days. The soil bacteria multiply rapidly with no measurable utilization of the hydrocarbons. Then, with large numbers of bacteria present, the mixture is swished around continuously up to several days, a situation which seems to stimulate the microbes to consume the hydrocarbons.

If there were plenty of oil-eating bacteria in the original soil sample, the hydrocarbon consumption would be measurable and would indicate to geophysicists that petroleum deposits exist.

Mr. Maddox' exploitation of the primeval oil prospectors is a modification of another system that only recently came into use.

Science News Letter, March 7, 1959

## GEOPHYSICS

### Balloon From Rocket Could Yield Wind Data

► A PLAN FOR probing the atmospheric winds and densities in the uncharted region between the lowest heights of orbiting satellites and the highest altitudes of reliable rocket measurements has been drawn by Dr. R. E. McCrosky of Harvard College Observatory.

Dr. McCrosky has calculated that a balloon 100 feet in diameter and weighing 65 pounds when inflated could do the job if fired from a rocket about 100 miles high. It would drift slowly earthward at a rate indicating both the wind and density of the air at its position at the time of observation.

Observations of the falling rate could be made by the following five methods:

1. Photographically at twilight. Its brightness would then be greater than any star seen at night, a magnitude of minus five and a half at a height of 100 miles, Dr. McCrosky calculated.
2. Photographically when illuminated by the full moon. In this case, its magnitude would drop to 7.5, still within the range of meteor and satellite tracking cameras as well as some of the larger missile tracking systems.
3. Photographically for a balloon illuminated by searchlights.
4. By telemetry of information obtained by an accelerometer attached to the balloon.
5. By radar tracking.

Recent development of the aluminum coated Milar balloons for satellite use by William J. O'Sullivan Jr. of the National Aeronautics and Space Administration made Dr. McCrosky's plan feasible.

Basic observations include not only the balloon's position at any time but some proof that full inflation was achieved. Its brightness would be one measure of this, Dr. McCrosky reported to the Smithsonian Institution's Astrophysical Observatory, where he is a consultant.

The balloon's falling rate can be measured accurately to within about a third of a yard. Damage from the impact of meteors is expected to be virtually negligible.

Science News Letter, March 7, 1959

## SCIENCE NEWS LETTER

VOL. 75 MARCH 7, 1959 NO. 10

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D.C., NORTH 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; ten or more copies in one package to one address, 7 1/2 cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright © 1959 by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS OF SCIENCE (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

## SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, U. S. Geological Survey; Wallace R. Brode, National Bureau of Standards; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Edward U. Condon, Washington University; Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University. Nominated by the National Research Council: I. I. Rabi, Columbia University; Leonard Carmichael, Smithsonian Institution; John R. Dunnington, Columbia University. Nominated by the Journalistic Profession: O. W. Riegel, Washington and Lee University; Lee Hills, Detroit Free Press. Nominated by the Scripps Estate: Edward J. Moeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Helen Buechi, Ann Ewing, Richard Little, Allen Lang, Jane Marye, Elisabeth Mitchell, Ralph Segman, Benita Tall, Marjorie Van de Water, Howard Simons (on Nieman Fellowship Leave). Science Youth Division: Joseph H. Kraus, Dorothy Schriver, Shirley Moore. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Heile Jenkins. Interlibrary Division in New York: Alexander Gade, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, METropolitan 8-2562.

## ASTRONOMY

# Dust Clouds Form Comets

English scientist suggests theory that primitive comets are formed when the sun and planets penetrate interstellar dust clouds in the Milky Way galaxy.

► PRIMITIVE COMETS are formed when the sun and its family of planets pass through interstellar dust clouds in their journey through space.

This theory, proposed by Dr. R. A. Lyttleton of St. Johns College, Cambridge, England, is based on the known fact that interstellar dust is found on a large scale in the Milky Way galaxy in which the sun is located. The sun must therefore interact with any gas clouds it encounters.

This interaction results in the individual particles in the cloud sweeping around the sun and converging behind it to form a narrow stream. Since the particles are then quite far from the sun, they gravitate toward each other, forming weakly bound swarms of particles that tend to fall almost directly towards the sun. These are the primitive comets.

Small deflections from passing stars and the action of the planets prevent a fair pro-

portion of these swarms from actually striking the sun. Those thus influenced become comets, a few of which are occasionally so spectacularly visible in the heavens to the naked eye. Most are spotted only on photographs, however.

Since some 250,000 long-period comets are known and their directions are randomly distributed, Dr. Lyttleton suggests that the sun must have passed through several clouds having different directions of relative velocity.

How the comets then evolve determines how much matter they contribute to the dust of interplanetary space. Many comets escape from the solar system. A long-period comet changed into a short-period one by a close brush with Jupiter would no longer be held together. Its particles would spread out, resulting in a meteor stream. To support this idea, Dr. Lyttleton notes that many short-period comets have disappeared within

recorded times, and many meteor streams are known without associated comets.

Other effects also cause the particles to spread out. When the comet is closest to the sun, the particles above the general orbital plane of the comet must cross down through it and vice versa. Colliding particles will have their energies slightly changed, so will move gradually away from the comet as a whole to give a meteor stream.

These collisions will also pulverize the particles, producing still smaller particles, some of which may be driven out of the comet by radiation pressure to form the tail.

Another result of the collisions, Dr. Lyttleton suggests, could be intense local heating at the tiny areas of contact resulting in sufficiently high temperatures to drive off volatile constituents.

This could be the main method for production of gas in a comet, not solar heating.

Although the gas release amount cannot now be estimated, Dr. Lyttleton believes that this gas release causes the nucleus formation. He reasons that, if huge numbers of particles in a swarm each give out a small amount of gas at a high temperature, a center must form somewhere within it from which the gas as a whole will stream radially outward. This, he reports, could possibly account for the formation of the nucleus as a comet approaches perihelion and its disappearance later as the comet recedes.

Dr. Lyttleton proposes that the tails of comets could serve as indicators of interplanetary gas. Some have been observed to be highly disturbed, as if "blown sideways by an interplanetary breeze," he reports in *The Observatory* (Oct., 1958).

Science News Letter, March 7, 1959

## ENGINEERING

# Paper From Corn Stalks

By BENITA TALL  
From Tel Aviv, Israel

► SOME TIME next year Israeli businessmen will probably be writing on "home-made" paper produced from corn stalk pulp.

The American Israeli Paper Mills at Hadera, about 18 miles north of Tel Aviv on the road to the seaport of Haifa, is pushing ahead with plans to use corn stalks, a local agricultural waste product, in its paper making. The company believes this will be the first commercial use of corn stalks in paper manufacture.

Results from pilot plant studies in the U. S. have shown that corn stalks are much like sugar cane, which is now being used to make pulp in several Latin American countries and in other places where the material is plentiful. Cereal straw, another local raw material, could also be used in the new pulp mill under construction. Experience obtained during the past two years in using imported straw pulp shows that these agricultural residue pulps can lessen Israel's dependence on costly imported wood pulps.

Many problems in using corn stalks, such as removing the soft center of the pith and transporting the bulky material quickly and economically, faced the paper mill engineers. With the cooperation of researchers, here and in the U. S., they have largely been solved. When the pulp mill begins

operation, an elaborate system of water flumes, tested at the hydrology laboratory of the Technion in Haifa, will float the bales of corn stalks to their destination. There also has been provision made for using pith as an auxiliary boiler fuel.

Depending on the kind of paper being produced, the corn stalk and cereal straw pulp will make up from 100% to about 20% of the final product. Imported wood pulp will still provide some 50% of the mill's pulp needs. The new pulp mill, part of a \$10,000,000 expansion program, will also be able to take in other agricultural residues, such as cotton stalks and sugar cane.

Israel now ranks third in the world in the per capita publishing of books. One in four persons from a population of more than 2,000,000 persons is enrolled in a classroom. These facts, together with the increasing use of paper products in advertising, packaging and wrapping, and a fast-growing population, indicate that every corn stalk and bit of straw will be grist for Israel's new pulp mill.

At the entrance of the paper mill's grounds there is a sign identifying the building that also reads: What Israel Makes, Makes Israel. The slogan, which seems at first an incongruous bit of American advertising, is truly "a sign of the times" as industry and advertising, in the shape of the Middle East's first major paper mill, comes to this old-new country.

Science News Letter, March 7, 1959



**CORN CANAL** — Bales of corn stalks, bound for the pulp mill, ride water flumes constructed to help Israel produce more paper.

## GENERAL SCIENCE

# Radiation "Body Count"

## See Front Cover

► SEVERAL PAJAMA-CLAD teen-aged scientists took turns climbing into a canvas hammock to spend a most unusual three minutes inside the "detector tank" of the Whole Body Counting Facility at Walter Reed Army Medical Center.

The instrument rapidly and accurately measured the natural and acquired radioactivity of their entire bodies, identifying and localizing any elements emitting gamma radiation. The only other such instrument in the world is at Los Alamos, N. M.

The "whole bodies" that were counted in the tank belonged to some of the 40 top winners of the 18th Science Talent Search, conducted by Science Clubs of America, an activity of SCIENCE SERVICE, and supported by the Westinghouse Educational Foundation of the Westinghouse Electric Corporation. One of them is shown in the photograph on the cover of this week's SCIENCE NEWS LETTER. The experience of the young scientists with the nuclear medicine facility was part of a visit to the Walter Reed Army Institute of Research and the Armed Forces Institute of Pathology, arranged for winners especially interested in the medical and biological sciences.

The young scientists learned that gamma photons from radioactivity in the body cause light flashes in an organic scintillating liquid, dissolved in 150 gallons of toluene and contained in the thick walls of the tank. The flashes are counted by 30 large

photomultiplier tubes, amplified, and recorded on electronic instruments outside the tank.

Information gathered from many such body counts will be used to establish a distribution chart of the radioactivity level in individuals from all parts of the world. The equipment also has great potential usefulness in the diagnosis and study of complex medical problems of disease and diet.

## Sugar Tagged by Tritium

► RADIOACTIVE SUGARS that will greatly facilitate the study of complex chemical processes have been developed by the National Bureau of Standards.

The new sugars contain tritium, the radioactive isotope of hydrogen, as a tracer element. Carbon-14, another tracer element, costs 11,000 times as much as tritium. Tritium gives off no more radiation than can be stopped by a sheet of paper.

The sugars were described to some of the 40 winners in the 18th annual Science Talent Search.

Tritium-bearing sugars enable scientists to determine the amount of sugar in any stage of chemical reaction, thereby helping them understand the roles played by individual molecules.

The new sugars may be used, for example, to study how the body converts glucose to galactose and to learn how bacteria react

with simple sugars to produce many complex substances.

Dr. Horace S. Isbell, who headed the Bureau's development of the tritium sugars, said that the need for expensive equipment had retarded previous use of tritium for tracer purposes. The Bureau now uses a Geiger-type counter that puts use of tritium for labeling purposes within the means of laboratories all over the country.

Whereas one curie of carbon-14 costs \$22,000, said Dr. Isbell, the same amount of tritium costs only \$2. Also, tritium requires no expensive shielding, as does carbon-14, and lends itself to sensitive measuring.

Science News Letter, March 7, 1959

## SEISMOLOGY

## Antarctic Continent Smaller Than Ice Sheet

► THE ANTARCTIC CONTINENT is much smaller than its ice sheet cover, two seismologists of the California Institute of Technology at Pasadena, Calif., have found from studies of earthquake waves.

Drs. Frank Press and Gilbert Dewart said they have found that, at most, three-fourths of the Antarctic ice sheet is underlain by continent, the remaining area being oceanic in structure. They also found that larger areas of the Antarctic land mass lie below sea level than has been thought.

Their results support the idea that the below-sea-level depths observed in measurements of ice thickness are primary features, not the result of the crust's sagging under a heavy ice load.

Drs. Press and Dewart base their conclusions on the higher-than-expected speed with which certain earthquake-generated waves traveled across the Antarctic continent. Their study is reported in *Science* (Feb. 20).

Science News Letter, March 7, 1959

## ARCHAEOLOGY

# Ancient Skull Found

► FROM THE WELL of a Mexican farmer has been drawn evidence of ancient Americans who lived in that area some 8,000 to 6,000 years ago.

The find helps to bridge the gap between the mammoth-hunting Tepexpan Man who lived 9,000 to 10,000 years ago, and the earliest farmers. It is described in *Science* (Feb. 27) by Dr. Helmut de Terra, geologist of Columbia University.

A mineral-coated human skull was brought up from a depth of 3.42 meters (about 11 feet) in the well. The find was not made recently. In 1955 that the farmer found the remains of his ancient ancestor and consulted his priest about giving him a Christian burial. Instead, the clergyman sent the skull to Mexico's National Museum but failed to notify museum officials of the circumstances of the find.

As a result, the important skull remained unnoticed, gathering dust in the museum, until recently when Dr. de Terra was invited to visit the site of the find which is close to the village of San Vicente Chicolapan and near the highway that leads from Mexico City to Texcoco.

Under the boulder where the skull had been found, Dr. de Terra found a fragment of a human rib and next to it an obsidian tool.

When the original well had been enlarged, something of the life of the 8,000-year-old Mexican was revealed.

He lived on seeds and other wild foods gathered from the country around him. This was shown by finds of grinding stones, metates and manos as well as obsidian knives, scrapers and flakes. One of the blades has a fine saw-toothed edge. The ancient Mexican understood the use of fire; two hearths containing charcoal were found nearby. But he had not yet learned to make pottery.

The new-found ancestor was a long-headed type, quite different from the older, round-headed Tepexpan Man.

Presence of the grinding stones indicates that he belonged to a collecting economy, food gatherers rather than farmers, of the "Chalco culture," now for the first time recognized as such, Dr. de Terra reports.

Science News Letter, March 7, 1959

## METEOROLOGY

## Weather Bureau Honors Volunteer Observers

► THE WEATHER BUREAU has honored 21 of its volunteer observers with more than 50 years of daily service by a special citation edition of its daily weather map.

The 21 are deans of the more than 7,000 cooperative observers who take and record weather data every day of the year, including Sundays and holidays, without pay.

Dr. F. W. Reichelderfer, chief of the Weather Bureau, said that knowledge of the U. S. climate would be meager without the daily records of volunteer observers. Dean of the corps is Barry C. Hawkins of Highlands, N. C., who has taken daily observations for more than 67 years. His period of personal service is only five months shorter than the entire history of the Weather Bureau as a civilian agency.

Brief highlights of the services of Mr. Hawkins and the 20 others honored in the special edition were reported on the back of the weather map published Feb. 26.

Science News Letter, March 7, 1959

## BACTERIOLOGY

# Bacteria Kill Insect Pests

Experiments with live bacteria show they killed 99% of the alfalfa caterpillars infesting a California field within 24 hours. The bacillus acts as a stomach poison to insects.

► BACTERIOLOGICAL warfare against insect pests is proving successful in California.

Scientists at the University of California in Riverside have reported using living bacteria, *Bacillus thuringiensis*, to kill off within 24 hours 99% of the alfalfa caterpillars infesting a field in the Imperial Valley.

The alfalfa caterpillar is one of the most serious pests of California's principal forage crop. The pest causes damage and control expense amounting to more than \$1,000,000 yearly.

They had previously reported success with the bacillus against two pests of cauliflower and cabbage, the cabbage looper and the imported cabbageworm.

Last December, the U. S. Food and Drug Administration gave the go-ahead sign for experimental use of insecticides containing these living microbes to eliminate plant pests. Studies had shown that such insecticides would not adversely affect warm-blooded animals. Human volunteers ate

and inhaled the bacillus without ill effects.

*Bacillus thuringiensis* is the first microbial pesticide compound in commercial production, though none is yet available for general grower use. For one year it will be applied as a dust or spray in various parts of the country to protect crops against certain insect pests.

The bacillus acts as a stomach poison. When insects swallow it, they sicken and die. The poisoning effect seems to be caused by toxic crystals that are formed by the bacillus during spore production. Crystals and spores are ingested when an insect feeds on treated foliage.

The nature of the toxin is not yet known. But if its chemical composition can be determined, it might eventually be synthesized. This could lead to a potent, highly specific insecticide.

Insects so far have shown no ability to develop resistance to the attacking bacillus. Furthermore, use of the material makes it unnecessary to use chemicals, some of which might harm beneficial insects.

The bacillus has also shown promise in limited tests on the cotton leaf perforator, and it may prove effective against the celery leaf tier, an insect that has caused some crop damage in the county of Ventura.

It may also help combat the housefly, the avocado leaf roller, the Egyptian weevil, the salt-marsh caterpillar and the cotton bollworm, the scientists reported.

Science News Letter, March 7, 1959

## ARCHAEOLOGY

## Ice-Age Mammoth Bone Resembles Elephant Bone

► SCIENTIFIC EXAMINATION of a bone from an ice-age mammoth has shown it to be remarkably well-preserved and very similar to corresponding specimens from modern elephants.

The spongy marrow cavity was found to be infiltrated with dirt, hair and small pebbles, but the outer surface resembled fresh bone in that it was shiny and smooth.

The bone had the characteristic odor of fresh bone, but was yellowish brown in color. There was no evidence of loss by leaching, and the typical bone pattern was remarkably intact.

Total nitrogen and acid-extractable carbonate were found to be at levels of fresh bone.

The particular bone fragment examined was probably a piece of a leg bone of an immature adult mammoth. Its histology and chemistry, studied by H. C. Ezra and S. F. Cook of the University of California at Berkeley, are reported in *Science* (Feb. 20).

Science News Letter, March 7, 1959

## MEDICINE

## Medical Plan Received With Optimism

► ESTABLISHMENT of an Institute of International Medical Research at Bethesda, Md., site of the other National Institutes of Health, is included in the "Health for Peace Act" proposed by Sen. Lister Hill (D-Ala.).

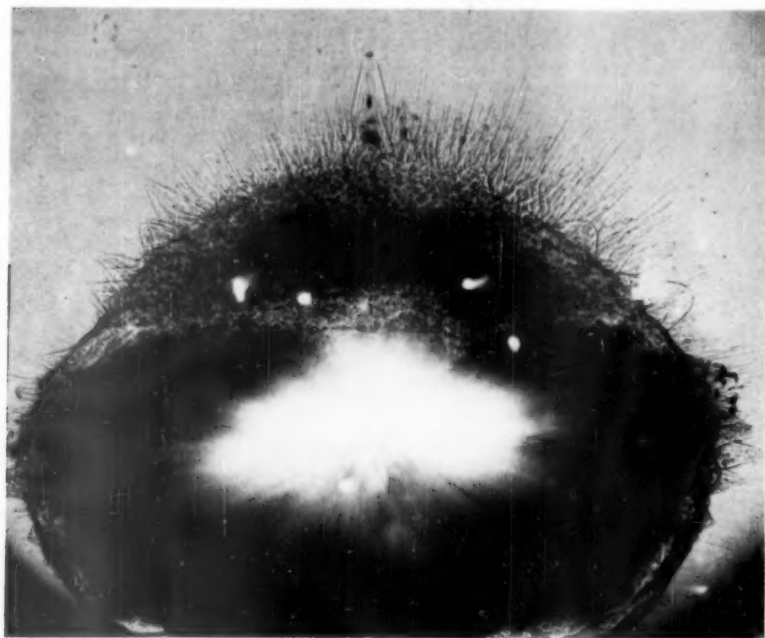
The new Institute would be directed, as are the other Institutes in Bethesda, under the authority of the Surgeon General of the U. S. Public Health Service.

Also under the proposed legislation, young scientists from the U. S. would exchange a period of study with their counterparts in other parts of the world. The counterparts could study at the new Institute. The Rockefeller Foundation is now educating trainees from other countries.

One problem will have to be solved if the legislation is passed: Many trainees are reluctant to return to their countries when the training period ends.

One of the fields the proposed bill would accelerate is the vast screening program for compounds that exhibit anti-cancer properties. Money to support such programs in other countries would speed up the search. Presently, Sen. Hill suggests that \$50,000,000 per year be appropriated for the international medical program.

Science News Letter, March 7, 1959



**EXPLODING DYNAMITE CAP**—The hair-like projections represent high-speed particles and their shock waves from this exploding dynamite cap, as it was photographed at 1/10,000,000 of a second in the stroboscopic light laboratory at the Massachusetts Institute of Technology by Dr. Harold E. Edgerton and two students, Vinod Sundra and Douglas Sinclair. Dr. Edgerton is chairman of the board and vice-president of Edgerton, Germeshausen and Grier, Boston firm that has been engaged in extensive research and development work, including the testing and photographing of A-bombs and H-bombs.

## GEOPHYSICS

**Evidence Indicates Stars Are Cosmic Ray Source**

► **INCREASING EVIDENCE** that cosmic rays come from the stars and perhaps from distant galaxies was reported at Pasadena, Calif., by Dr. H. V. Neher, physics professor at California Institute of Technology.

He said possible sources for cosmic rays included super-novae, or exploding stars, and radio signal sources in space. The radiation might also be the residue of the birth or death struggles of stars.

Dr. Neher, a member of the panel on cosmic radiation of the U. S. National Committee for the International Geophysical Year, has just returned from an IGY expedition that made cosmic ray measurements from sea level to 100,000 feet altitude and from the Arctic to the Antarctic. The information was obtained by radio from 80 instrumented balloons.

It showed that cosmic rays probably do not come from the sun, Dr. Neher found. The IGY study on cosmic ray distribution is supported by the Office of Naval Research and the National Science Foundation.

Balloon measurements give several hours' worth of data, compared to the few minutes' worth available for rocket flights. Many of the measurements were taken simultaneously from an ocean and a land location. This double-check method is so the scientists can determine whether variations in the cosmic radiation were due to latitude changes or to world-wide fluctuations.

Science News Letter, March 7, 1959

## TECHNOLOGY

**Higher Cost No Bar to Synthetic Diamond Use**

► **THE GAP** between the price of synthetic diamonds and the price of nature's own industrial diamonds is rapidly closing, the world's only significant producer of man-made diamonds told **SCIENCE SERVICE**.

General Electric Company's disclosure that man-made industrials the size of sand grains are selling for just 70% of their initial price in 1957 indicates that the synthetic cutting stones now are firmly entrenched in America's tool industry where they are used to sharpen new ultra-hard cemented carbide tools and to maintain existing tools in good condition.

General Electric Company sells synthetic diamonds for industrial cutting purposes for \$2.96 per carat today, whereas the first bulk sales 18 months ago brought \$4.25 per carat.

Although the price tag has been lowered, the synthetics still sell for a little more than natural stones. The tool industry's reason for accepting General Electric's diamonds even at the higher price is explained by Dr. H. Tracy Hall, director of research, Brigham Young University, Provo, Utah, in a review of high pressure research in *Science*.

Dr. Hall points out that synthetics sell in spite of their slightly higher price because "extensive tests have shown that the

grinding efficiency of the man-made diamonds exceeds that of natural diamonds by 35%."

Officials of General Electric's metallurgical products department, Detroit, emphasized that the efficiency figure stated by Dr. Hall is "only an average and applicable only to the grinding of cemented carbide tools." They told **SCIENCE SERVICE** actual tests place a synthetic diamond grinding wheel's wear as "at least 15% and up to 75%" better than the wear characteristics of a grinding wheel impregnated with natural diamonds.

There is a simple explanation for this difference.

"Man-made diamond crystals are rough and blocky," they said, "whereas natural diamonds are smooth; therefore the manufactured variety stays bonded to the grinding wheel longer, cuts more freely and requires 20% to 35% less power in wheel operation."

Because of the difference in shapes of the crystals, General Electric officials pointed out, the rough synthetics will stay lodged in the grinding wheel long after wearing has caused the smooth natural diamonds to "pop out."

Science News Letter, March 7, 1959

## METALLURGY

**Bureau of Mines Makes Yttrium Ductile**

► **YTTRIUM**, a metal long considered too brittle for structural uses, has been transformed into a pliable, easily formed material that may find important applications in atomic reactor and missile designs.

The transformation method was discovered by U. S. Bureau of Mines metallurgists in Albany, Oreg., who learned recently that yttrium's forming qualities could be improved by ridding it of dissolved gases.

Yttrium's advantage in the nuclear field is its relatively low thermodynamic cross section. This means it has less resistance than many other materials to the passage of neutrons needed to sustain a nuclear reaction. The metal also has a melting point of 2,825 degrees Fahrenheit, about equivalent to that of carbon steel, and high enough to enable it to withstand reactor temperatures.

Yttrium is found in close association with the rare-earth elements and is difficult to separate from its companion metals. It is produced commercially in relatively small amounts and is rather expensive.

The best yttrium available before the discovery of the new method had limited ductility, even though it was almost free of contaminants. Although the new method does not reduce production costs, it does not increase them significantly and certainly results in a material with improved ductility capable of wider applications.

The Bureau of Mines foresees a potential value for yttrium in alloys. Moreover, availability of the metal in ductile form will permit a reevaluation of its possible applications in other important fields.

Yttrium, pronounced IT-ree-um, is No. 39 on the periodic table of chemical elements. It has at least 14 radioactive isotopes.

Science News Letter, March 7, 1959

**IN SCIENCE**

## MEDICINE

**Successful Preservation Makes Bone Bank Reality**

► **THE SUCCESSFUL PRESERVATION** of living bone marrow cells that will make a "bone marrow bank" a reality has been announced.

Live bone marrow cells have been preserved in a frozen state and later injected into the patients they were originally drawn from. The intravenous injections produced dramatic improvement in the low blood counts of the patients who were receiving radiation therapy for cancer, Dr. Nathaniel B. Kurnick, chief of the hematology service at the Long Beach, Calif., Veterans Administration Hospital, said.

Bone marrow was taken from four cancer patients at the hospital. The marrow was slowly frozen in glycerol to keep ice crystals at a minimum and was maintained at minus 79 degrees centigrade. Cells may be stored in this manner for at least one year and perhaps indefinitely, Dr. Kurnick said.

When the patients' blood showed a dangerously low level of vital elements because of injury to the marrow from X-rays, the preserved marrow was thawed and injected.

Vigorous growth of new bone marrow cells was noted within weeks after the injections. Blood counts returned to nearly normal within a month to six weeks. There were no adverse side reactions to the injections.

Now that preservation of bone marrow has proved to be successful, cancer patients can be treated much more intensively with radiation than has been thought advisable in the past, the doctor said.

Because the body rids itself of all foreign tissue and cells, doctors have not been able to transplant healthy bone marrow cells from one person to another except in identical twins.

Science News Letter, March 7, 1959

## ENGINEERING

**Plastic Forms Make Unusual Concrete Effects**

► **UNUSUAL ARCHITECTURAL** effects are being obtained through the use of plastic forms for shaping concrete.

J. A. Hanson, development engineer of the Portland Cement Association in Chicago, told the American Concrete Institute meeting at Los Angeles that architectural treatment may consist of both surface finish and pattern decoration.

The plastic forms enable concrete surfaces to be made glossy smooth or textured. Pattern decoration is achieved by vacuum forming the plastic sheet over wood, plaster, metal, glass or other pattern materials.

Science News Letter, March 7, 1959

# IE FIELDS

## CHEMISTRY

### Trees May Protect Earth From Pollution Heating

► TREES may be able to save mankind from a disastrous warming of the earth resulting from air pollution.

A "tremendous increase" in the blanket of carbon dioxide that industrial man is loosing into the atmosphere surrounds the earth and will tend inevitably to capture more heat from the sun.

Dr. Chauncey D. Leake, professor of pharmacology at Ohio State University, warned the National Conference on Air Pollution, Washington, D. C., that if the heat capture occurs it will cause a "gradual melting of the huge polar ice caps, and the gradual rise of our oceans, drowning out still further our shore lines."

He believes the extensive planting of trees, ten for every car and 100 for every truck, might help. Trees and other green plants absorb carbon dioxide and "breathe" oxygen into the atmosphere.

Dr. Leake also urged automobile manufacturers to direct greater effort to the problem of controlling exhausts.

Science News Letter, March 7, 1959

## ICHTHYOLOGY

### Colorful Parrotfish Wear "Nightgowns"

► WEARING nightgowns is just one of the odd things about the parrotfishes.

They also have teeth in their throats.

Described as one of the "most resplendent of all sea creatures," the parrotfishes belong to a family found throughout the world's tropical waters. Now, in the first systematic zoological description of the whole group, published by the Smithsonian Institution, details of the parrotfishes' habits and characteristics are revealed.

Wearing nightgowns is apparently limited to one of two West Indian species, Dr. Leonard P. Schultz, U.S. National Museum curator of fishes, said. As night begins, the fish starts secreting a transparent mucous envelope. Starting with the mouth and extending backward, the envelope completely encloses the body except for a little flap with a hole in the center in front of the fish's open mouth and a small hole in the rear.

The nightgown-making process takes from 30 minutes to an hour and a half. It stops entirely, Dr. Howard E. Winn of the University of Maryland observed, whenever light is turned on.

Wearing nightgowns and spending the night leaning against some solid object—rocks, arms of coral, or inside conch shells—seems to be a practice dictated by some nervous mechanism set off by darkness.

Parrotfishes, Dr. Schultz pointed out, eat mostly algae which are scraped from the coral branches. Their so-called pharyngeal

mill, or teeth in the throat, crushes coralline algae, coral fragments and other food items.

There are about 80 species known, with color patterns including blue, pink, red, orange and yellow. A few species are brownish; some of these drab fish are females. Males predominate in shades of green or blue with green teeth.

Science News Letter, March 7, 1959

## BIOCHEMISTRY

### Lipid Research Lab To Be Set Up at UCLA

► A CENTER for the study of fatty substances that cause heart trouble is being established at the University of California at Los Angeles.

To be known as the Lipid Research Laboratory, the center will be supported by National Heart Institute grants of up to \$60,000 annually for at least five years.

Dr. James F. Mead of UCLA's physiological chemistry department will be director of the center's program, which will include both training and research in the complex lipid field.

Research to be carried out in the UCLA laboratory includes determination of the composition of fatty deposits that obstruct the arteries, leading to high blood pressure and heart disease, and studies of changes in brain lipids due to aging and of changes in blood lipids with different amounts of dietary proteins.

The program is part of a nation-wide effort initiated by the National Heart Institute because of increasing awareness of the importance of fats in health and disease and the need for more research personnel trained in the field, Dr. Mead said.

Similar centers are being established in the East, Midwest, South and Southwest. The laboratory will be located in UCLA's West Medical Campus Building. It will contain the most modern equipment for separation and analysis of the complex mixtures that make up the natural lipids. These include a gas chromatographic apparatus, capable of complete analysis of samples too small for the naked eye to see, and radioactive tracer equipment.

Science News Letter, March 7, 1959

## ANIMAL HUSBANDRY

### Pellets Fatten Lambs for Market in Four Months

► PELLETTED FEEDS could enable flock owners to fatten lambs ready for market in four months after birth, tests made by Arthur L. Pope, University of Wisconsin sheep specialist, have indicated. The average time now is six to seven months.

Mr. Pope predicted that feed pellets are the "coming thing" in lamb feeding, and that in ten years flock owners no longer will use baled hay. The pellets contain corn, alfalfa leaf meal, soybean oil meal, bone meal and trace mineralized salt as the basic ration, plus added antibiotics and vitamins.

Science News Letter, March 7, 1959

## BIOCHEMISTRY

### Man-Made Antibiotic Achieved in 30 Steps

► THE TOTAL SYNTHESIS of an antibiotic that has biological activity may pave the way for other man-made antibiotics that cannot be made from living organisms.

Chemists at Lederle Laboratories Division of American Cyanamid Company in Pearl River, N. Y., have produced by a series of 30 chemical reactions a derivative of demethylchlortetracycline, an antibiotic previously available only by fermentation of living organisms. Drs. James H. Boothe, Andrew S. Kende and Raymond G. Wilkinson with Thomas L. Fields report their total synthesis in the *Journal of the American Chemical Society* (Feb. 20).

The tetracyclines are a family of chemical compounds, including such antibiotics as Aureomycin chlortetracycline and Terramycin oxytetracycline, which have proved useful in control of bacterial diseases.

Synthesis of the complex compound proves that the chemical structure assigned to demethylchlortetracycline and other antibiotics of this family are correct. The scientists are now trying to synthesize other tetracyclines, although they do not believe that the man-made process will compete economically with the current fermentation methods.

Science News Letter, March 7, 1959

## PUBLIC HEALTH

### Model Program Shows Filariasis Control

► THERE IS real hope of controlling filariasis, a mosquito-borne disease suffered by 189,000,000 people in the tropical regions of the world.

A model medical program conducted in experimental areas of Tahiti has shown how it can be done, Dr. John Kessel, professor of infectious diseases at the University of California at Los Angeles Medical School, reported following a tour of infected areas.

The highly successful control program is a joint effort of the French Overseas Medical Service and the UCLA Medical School.

It involves both the use of a drug, diethylcarbamazine, which destroys the tiny disease parasite in the human bloodstream, and control of mosquitoes that carry the disease organism.

Children in the one-to-five age group who have grown up in areas where the program is enforced are free from infection, Dr. Kessel reported. Formerly six percent of this age group were infected.

Studies related to the introduction of similar programs in the Fiji Islands, Indonesia, Malaya, India and parts of Africa are in progress, he says. He believes that if ways could be found to institute Tahiti-type programs throughout the world's infected areas, filariasis could be wiped out.

Filariasis is an infection that causes chills, fever, headache, and discomfort. It is caused by adult worms that live in the lymphatic or circulatory systems, connective tissue or body cavities.

Science News Letter, March 7, 1959

## METEOROLOGY

# Space and Stars for All

A close look at the planets and stars is available at the more than 200 planetariums now operating. They are among the most popular educational centers in the U. S.

By ANN EWING

► **SPACE TRAVEL** is predicted within the next ten years, but a close look at the planets and stars is available now.

More than 200 planetariums scattered around the country are showing hundreds of thousands of persons yearly the nearness of the starry heavens.

Whether the twinkling lights of faraway suns are seen brilliantly portrayed against real space or against the artificial heavens of a planetarium dome, the grandeur of a star-sprinkled sky seems always to inspire breathtaking wonder.

In today's age of racing into space, the planetariums now operating in the U. S. alone are among the most popular centers of scientific education. For instance, in Chapel Hill, N. C., with a population of about 10,000, attendance at the University of North Carolina's Morehead Planetarium runs about 80,000 annually. More than 600,000 persons a year visit the American Museum-Hayden Planetarium in New York City.

The steady annual attraction of such large planetariums led to development of the medium-sized Spitz planetarium, whose cost is low enough to make it available to schools, museums or libraries even in small communities. For less than \$20,000, excluding land but including dome and seats, any person or group can have the stars almost literally in their backyard.

## First Spitz Planetarium

Producing a cheap planetarium was long the dream of Armand N. Spitz, a self-taught astronomer with a background in newspaper and museum work. The first model appeared in 1947 and, since then, some 200 communities have installed these or later, improved projectors.

More recently the Spitz organization has produced large planetariums comparable to those in New York and Chapel Hill. Mr. Spitz has also gone down the scale in size, devising a small projector that can be used to bring the heavens into any suitable room. It is produced by a toy manufacturer.

The records of nearly every civilization show a fascination with and a desire to learn more about the pinpoints of light in the night sky. The attempts to re-create the motions of stars and other heavenly objects led finally to construction of today's planetariums. Many of these early attempts can now be seen in museums or are duplicated in the exhibit areas of planetariums, but none of them portray the sky with the breathtaking reality and the accuracy of a modern planetarium's darkened dome.

The first planetarium was completed at the Zeiss works in Jena, Germany, in 1924. Following this success, some 25 improved versions were built, six being installed in the U. S. and the rest in Europe. Besides New York and Chapel Hill, Zeiss projectors are installed in the Adler Planetarium in Chicago, the Fels Planetarium in Philadelphia, the Griffith Observatory and Planetarium in Los Angeles and the Buhl Planetarium and Institute of Popular Science in Pittsburgh.

The Morrison Planetarium in San Francisco contains a modified Zeiss instrument constructed in shops operated by the California Academy of Sciences.

The Zeiss projector is a dumbbell-shaped object about 12 feet long. In the two large globes at each end are the projectors for all the fixed stars visible from either hemisphere. The projector is a highly scientific elaboration of the familiar lantern by which slides are shown on a screen. The lantern slides are so shaped that the images fit together to make a complete picture of the starry heavens.

The Zeiss projector turns independently on any one of three axes: one parallel to

the polar axis of earth, one perpendicular to the plane in which the earth moves about the sun, and a horizontal one for demonstrating the appearance of the skies from different latitudes.

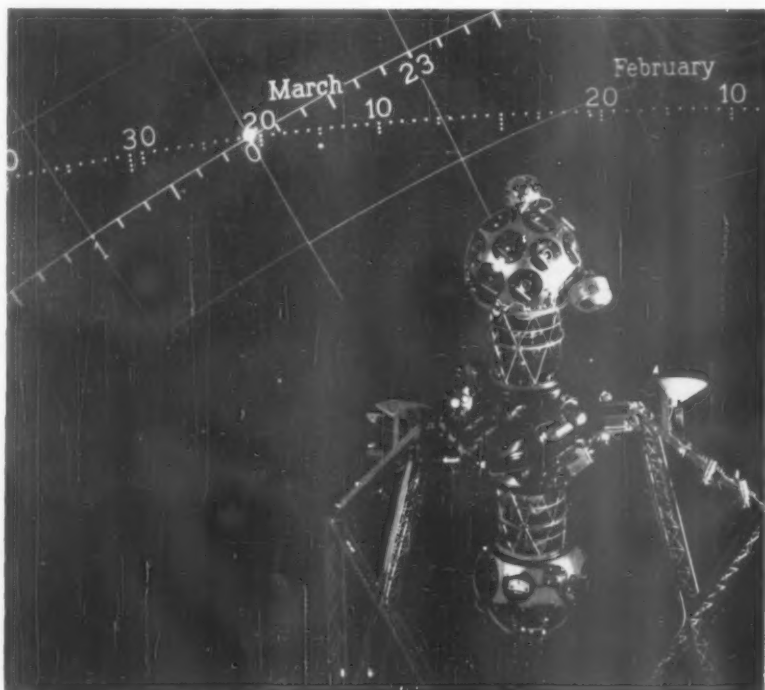
The whole apparatus has several different speeds, all many times faster than real motions. Thus a very long astronomical story, such as how the heavens looked 5,000 years ago, can be condensed into a few minutes. Separate projectors are used for nearby objects such as the planets and sun, and their motions are also separately controlled.

All possible motions of all projectors are remotely controlled by a lecturer from a switchboard located in a speaker's stand at one wall.

The small Spitz planetarium differs considerably from the Zeiss. The original model was a dodecahedron (12-sided) assembled from 12 pentagonally shaped black plastic sheets. At the center was a small electric bulb. Its light, shining through holes machined in the surface of the dodecahedron, made the star images.

In later models, the plastic has been replaced by aluminum, and special lens-type projectors have been attached for each of the first magnitude stars.

Large Spitz instruments, comparable to the Zeiss, are installed at Flint, Mich., the



**SIMULATED STARS**—How the seasons are shown by the sun's apparent motion against the background of stars is pictured in this photograph of a planetarium dome. Spring arrives this year March 21 at 3:55 a.m. EST.

U. S. Air Force Academy in Colorado Springs, and in Montevideo, Uruguay.

In Boston, another planetarium is being installed, part of the Museum of Science in Science Park. This instrument was built by Frank Korkosz at his shop in Springfield, Mass. It is a completely new design incorporating the advantages of both Zeiss and Spitz.

Many other planetarium installations are on drawing boards. Washington, D. C., St. Louis, Miami, San Diego, Milwaukee and Spokane are among the cities indicating interest in erecting a large planetarium.

The Zeiss works are again back in operation, both in East and West Germany, and each produces large planetariums to order. The Goto Manufacturing Company in Japan reportedly has said it would produce planetariums.

However, as Armand Spitz points out, the type of planetarium instrument used is not important. A planetarium is like a musical instrument, he said, and good or poor music is forthcoming depending upon who operates it. Its success depends upon the imagination, vision and dedication of the operator.

## Planetariums Teach

A planetarium is actually a time and space machine. It is also, and more importantly, a most versatile and dramatic teaching aid.

It can be used to dramatize not only astronomy, but geography, mathematics, navigation and other physical sciences. It can be useful in teaching persons of all ages, from kindergartners to great grandparents.

The use of a planetarium in the general education programs of schools and colleges is augmented by the large part it plays in training for military operations.

The general field of adult education, separate from either schools or military requirements, also draws upon a planetarium. Boat owners, pilots, fishermen, hikers, and nature lovers in general take advantage of planetariums.

The medium-sized Spitz planetarium projector, which by itself costs about \$6,000, stands about three feet high and weighs only 25 pounds. Thus it is readily portable, and the Boston Museum of Science took advantage of this fact to set up the world's first traveling planetarium.

More recently, the United Nations Educational, Scientific and Cultural Organization bought a Spitz planetarium and is using it similarly on a world-wide scale.

Sometimes the purchase of a planetarium depends on the success of a fund-raising campaign. Among the ingenious methods devised to help promote such a campaign is one urging persons in the community concerned to "buy a piece of the sky."

The sun and the moon might, for instance, be sold for \$500, the planets for \$100 and up, constellations for \$100, choice bright stars at \$25 and lesser stars down to one dollar apiece.

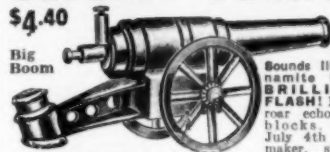
This kind of promotion could be used by any community seeking to enlarge its educational and cultural facilities for residents and nearby communities.

Science News Letter, March 7, 1959

## Carbide Cannon

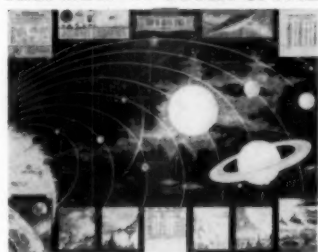
\$4.40

Big Boom



Sounds like dynamite blast! BRILLIANT FLASH! Mighty roar echoes for blocks. Fine July 4th noisemaker, starting gun, celebrations, etc. Safe. No recoil. Hundreds of shots for few cents. Uses carbide. Fast firing. Attractively made of heavy cast iron. Money back guarantee. 9-in. Cannon \$3.95 plus 45¢ post. **SEND \$4.40.** 17-in. \$8.95 plus 55¢ post, send \$9.50. Ammunition 39¢ tube (500 shots); 3 tubes \$1.00 postpaid. **JOHNSON SMITH CO., Dept. 768, Detroit 7, Mich.** Catalog of 3000 Novelties 10¢

## RAND McNALLY'S First MAP of OUTER SPACE



**THOUSANDS SOLD ALL OVER THE WORLD. EMPATHY!** True space colors make you feel actual space travel! Covers billions of space miles. Accurate and reliable. Special close up pictures and illustrations. Provides outer space and space age information. A quick and easy way to understand the solar system. Special 60 lb. weight map stock. A unique and modern decoration. A must for schools, offices, the military, libraries, professional waiting rooms, laboratories, etc.

WALL SIZE, 42" X 33"

Postage included, \$1.95 each. Two for \$3.69.

**DICK KENT, Trader**

P.O. Box 264, Camp Hill, Penna.

"World Wide Scientific, Educational Specialties"

## Rider's BASIC SCIENCE series

**ENERGY** by Sir Oliver Lodge, F.R.S. The long awaited reprint of this classic exposition by the eminent English physicist has been modernized, edited and illustrated. #200, \$1.25.

**HEAT** by Alex. Efron, E.E., Ph.D. While it is a classical study of the subject, it progresses to the modern concepts of basic thermodynamics and their applications to heat engines such as turbo props, ramjets and rockets. #200-2, \$1.50.

**MECHANICS** by Alex. Efron, E.E., Ph.D. Initial discussion covering vectors, their application to moments and torques; the laws and theory of motion; energy, work, frictional forces and mechanical efficiency provides the foundation for a more penetrating analysis of the subject. #200-3, \$1.50.

**LIGHT** by Alex. Efron, E.E., Ph.D. Starting with the various theories of light and the methods used to determine its velocity, the text considers its behavior from the point of view of light rays. Using the wave theory as a basis, reflection and refraction are examined. Deals with optical instruments, light sources and energy, and recent developments in illumination. #200-4, \$2.25.

**SOUND** by Alex. Efron, E.E., Ph.D. Covers the physical nature of sound and the characteristics of hearing with all the ramifications of acoustics, music instruments, the human voice. #200-5, \$1.25.

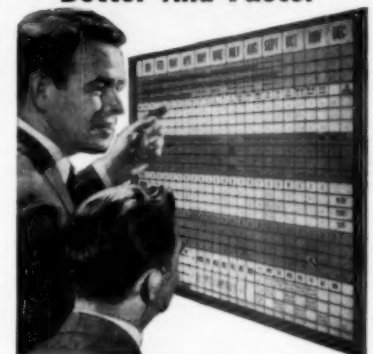
**LIQUIDS AND GASES** by Alex. Efron, E.E., Ph.D. While primarily concerned with the "why" of the subject, this probing analysis includes discussion of the practical applications of the theory. The text covers such aspects as the behavior of liquids and gases, pressures in fluids, Archimedes' principle, relative density, etc. #200-6, \$2.10.

**NUCLEAR ENERGY** by Alex. Efron, E.E., Ph.D. The atom, its makeup and uses are completely explained. Starting with the history: the electron, proton and neutron; natural radioactivity, alpha, beta and gamma rays, detectors, isotopes, the book progresses to advanced concepts such as the mass-energy relationship, induced radioactivity, nuclear fission, hydrogen bomb, etc. #200-7, \$1.25.

available at bookstores, or order direct: SN-3

**JOHN F. RIDER PUBLISHER, INC.**  
116 West 14th Street, New York 11, N. Y.

## How To Get Things Done Better And Faster



### BOARDMASTER VISUAL CONTROL

- ☆ Gives Graphic Picture — Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal, Compact and Attractive. Over 350,000 in Use

Full price **\$49.50** with cards

**FREE**

24-PAGE BOOKLET NO. V-10

Without Obligation

Write for Your Copy Today

**GRAPHIC SYSTEMS**

55 West 42nd Street • New York 36, N. Y.

## Get UNITRON's FREE Observer's Guide and Catalog on ASTRONOMICAL TELESCOPES

This valuable 38-page book  
is yours for the asking!

With artificial satellites already launched and space travel almost a reality, astronomy has become today's fastest growing hobby. Exploring the skies with a telescope is a relaxing diversion for father and son alike. UNITRON's handbook contains full-page illustrated articles on astronomy, observing, telescopes and accessories. It is of interest to both beginners and advanced amateurs.

Contents include—

- Observing the sun, moon, planets and wonders of the sky
- Constellation map
- Hints for observers
- Glossary of telescope terms
- How to choose a telescope
- Amateur clubs and research programs



**UNITRON**

INSTRUMENT DIVISION of UNITED SCIENTIFIC CO.  
204-206 MILK STREET • BOSTON 9, MASS.

Please rush to me, free of charge, UNITRON's new Observer's Guide and Telescope Catalog 5-01

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**ADVANCES IN VIRUS RESEARCH**, Vol. VI—Kenneth M. Smith and Max A. Lauffer, Eds.—*Academic*, 382 p., illus., \$10. On purification, biochemistry and spread of plant viruses, measles virus, and paramyxium.

**ALBINISM IN NORTH AMERICAN AMPHIBIANS AND REPTILES**—Max Hensley—*Museum, Mich. State Univ.*, 14 p., paper, single copies free upon request direct to publisher, East Lansing, Mich. Catalogue of geographical occurrences.

**ANIMAL BABIES**—Photographs by Illa, words by Arthur Gregor—*Harper*, 40 p., \$2.75. Appealing photographs for young and old.

**ATOMIC AGE PHYSICS**—Henry Semat and Harvey E. White—*Kinechart*, 230 p., illus., paper, \$2. Covers second part of a nation-wide NBC-TV course.

**ATOMIC INDUSTRIAL PROGRESS AND SECOND WORLD CONFERENCE**, July-December 1958—*U. S. Atomic Energy Commission (Govt. Print. Off.)*, 486 p., illus., paper, \$1.25. Twenty-fifth Semiannual Report, AEC.

**BEYOND THE REEFS**—William Travis—*Dutton*, 221 p., illus., \$3.95. Experiences of a skin diver in the Indian Ocean.

**BREAD: The Staff of Life**—Walter Bucher—*Morrow*, 80 p., illus., by author, \$2.75. For grade school children.

**A CHANGING AMERICA: At Work and Play**—A. W. Zelomek—*Wiley*, 181 p., \$3.95. Statistician's analysis of the interrelatedness of changes in our society.

**CHARLES DARWIN: Evolution and Natural Selection**—Bert James Loewenberg, Ed.—*Beacon Press*, 434 p., illus., paper, \$2.25. Anthology of Darwin's writings.

**A GUIDE TO NUCLEAR ENERGY**—R. F. K. Belchem—*Philosophical Lib.*, 77 p., illus., \$3.75. Explains for the general reader how various types of nuclear reactors function.

**HEREDITY AND EVOLUTION IN HUMAN POPULATIONS**—L. C. Dunn—*Harvard Univ. Press*,

157 p., \$3.50. Reconsideration, in the light of modern genetic knowledge, of the evolutionary forces that mold human populations, written for the layman.

**HOW TO STIMULATE YOUR SCIENCE PROGRAM**—Matthew F. Vessel and Herbert Wong—*Fearon Publishers*, 32 p., illus., paper, \$1. Teacher's guide to simple science activities.

**IN THE STEPS OF THE PHAROAHs**—Jean Leclant—*Hastings House*, 128 p., photographs by Albert Raccah, \$8.50. Records the splendor of the Egypt of the Pharaohs.

**INDIVIDUAL BEHAVIOR AND GROUP ACHIEVEMENT, A Theory: The Experimental Evidence**—Ralph M. Stogdill—*Oxford Univ. Press*, 352 p., \$5. Attempts to develop a theory of organizational achievement.

**INTERFERENCE BETWEEN POWER SYSTEMS AND TELECOMMUNICATION LINES**—H. R. J. Klewe, foreword by Sir Gordon Radley—*Arnold E. & Co. (St. Martins)*, 256 p., \$12.50. Report by the Electrical Research Association on the effects of proximity.

**INTRODUCTION TO SYMBOLIC LOGIC AND ITS APPLICATION**—Rudolf Carnap, transl. from German by William H. Meyer and John Wilkinson—*Dover*, 241 p., paper, \$1.85.

**AN INTRODUCTION TO THE BEHAVIOR OF INVERTEBRATES**—J. D. Carthy—*Macmillan*, 480 p., illus., \$8. Concerned with the behavior of invertebrates in response to external factors and the role which this behavior plays in the natural life of the animal.

**INVENTORS' PROGRESS**—Joachim G. Leithauser, transl. from German by Michael Bullock—*World Pub. Co.*, 286 p., illus., \$4.50. Of the men and the concepts that brought about today's technology.

**JOURNAL OF GEOPHYSICAL RESEARCH**, January 1959—Philip H. Abelson and J. A. Peoples, Jr., Board of Eds.—*Am. Geophysical Union*, 142 p., illus., paper, annual subscription \$16. Beginning

with this issue (Vol. 64, No. 1), the Journal is published monthly, combining the scientific material formerly published in the bi-monthly *Transactions, Am. Geophysical Union*, and the quarterly *Journal of Geophysical Research*.

**LIQUID HELIUM**—K. R. Atkins—*Cambridge Univ. Press*, 312 p., illus., \$11. Exposition of the current state of the theory and detailed survey of experimental results.

**MADAME CURIE**—Eve Curie, transl. by Vincent Sheean—*Pocket Bks.*, 419 p., paper, 50¢. Reprint of 1937 edition.

**THE MENTALLY RETARDED IN SOCIETY**—Stanley Powell Davies with Katherine G. Ecob—*Columbia Univ. Press*, 248 p., \$5.50. Historical background and information about modern practices and attitudes.

**MODERN SHRUBS**—E. H. M. Cox and P. A. Cox, foreword by F. P. Knight—*Nelson*, 220 p., illus., by Margaret Stones, \$6.25. Information on planting, soil, shelter, feeding, pruning and thinning, and various methods of propagation.

**1958 BOOK OF ASTM STANDARDS INCLUDING TENTATIVES, Part 3: Methods of Testing Metals (Except Chemical Analysis)**—*Am. Soc. for Testing Materials*, 962 p., illus., \$10.

**NUTRITION OF THE LEGUMES**—E. G. Halls-worth, Ed.—*Academic*, 359 p., illus., \$10.50. Proceedings of the University of Nottingham Fifth Easter School in Agricultural Science, 1958.

**OPTICAL PROPERTIES OF SEMI-CONDUCTORS**—T. S. Moss—*Academic*, 279 p., \$9. For the experimental physicist and advanced student.

**RADIOACTIVITY MEASURING INSTRUMENTS: A Guide to Their Construction and Use**—M. C. Nokes—*Philosophical Lib.*, 75 p., illus., \$4.75. Instructions for students.

**THE ROCK-HUNTER'S FIELD MANUAL: A Guide to Identification of Rocks and Minerals**—D. K. Fritzen, foreword by Wesley Dexter Gordon—*Harper*, 207 p., illus., by Lon Fox, \$3.50. Reference work for the student and amateur.

**ROCKET AMATEUR'S GUIDEBOOK**—John Bridgewater and James Mountain—*Space Products Corp.*, 24 p., paper, \$1. Guide to amateur rocketry information sources.

**ROCKS AND MINERALS**—Illa Podendorf—*Grosset*, 48 p., illus., by George Rhoads, \$1. An easy-to-read book of facts.

**SCIENCE EXPERIMENTS**—Illa Podendorf—*Grosset*, 47 p., illus., by Mary Salem, \$1. Simple experiments for beginners.

**SOLID PROPELLANT ROCKETS—SECOND STAGE: An Introductory Handbook**—Alfred J. Zachringer—*Am. Rocket Co.*, 306 p., illus., \$8. For the engineer or scientist.

**TREE FRUIT PRODUCTION**—James S. Shoemaker and Benjamin Teskey—*Wiley*, 456 p., illus., \$6.95. Emphasis is on recent research leading to improved production and handling methods of tree fruits.

**THE TRUE BOOK OF SPACE**—Illa Podendorf—*Childrens Press*, 48 p., illus., by Robert Borja, \$2. A second grade reader.

**TYPE SPECIMENS OF MARINE MOLLUSCA DESCRIBED BY P. P. CARPENTER FROM THE WEST COAST (San Diego to British Columbia)**—Katherine Van Winkle Palmer—*Geological Soc. of Am.*, 376 p., illus., \$7.50. Investigates, locates and illustrates the types of species described in Carpenter's Catalogue in 1857.

**THE VALUE OF SCIENCE**—Henri Poincaré, introd. by George Bruce Halsted—*Dover*, 147 p., paper, \$1.35. Reprint of first English translation.

**YOUNG CHILDREN IN HOSPITALS**—James Robertson, foreword by Milton I. E. Senn—*Basic Bks.*, 146 p., \$3. Tells how sympathetic handling by parents can help minimize a child's upsetting experience.

Science News Letter, March 7, 1959

Study live  
insects and whole  
specimens!



with TESTA  
WIDE FIELD  
MICROSCOPE

Rugged, full-size American-made microscope features large working distance and 15x, 45x, and 75x magnification. Unusual versatility. Arm can be inclined in any direction of a 360° circle. Tube removable for field trips.

Kellner-type eyepiece. Triple divisible objective. Dual control coarse and fine focusing. Large reversible black and white stage. **\$54.85**

Write for full details!

**TESTA MANUFACTURING CO.**

Dept. SN-3 • 10122 East Rush Street, El Monte, Calif.

## TO MEN WHO JUST "CAN'T LEARN" MATH!

More and more in our dynamic economy, a knowledge of basic mathematics pays off! Whether in Engineering, Electronics, Mechanics, Construction, Pure Science, etc.—or in Estimating, or Trade and Finance, or Buying and Selling, etc.—the man who gets there *fastest* with the *masterful* MATH-WISE, is likely to be rewarded handsomely! Fortunately, there now exists, in a single volume of 240 fact-packed pages (including 195 clarifying illustrations, a basic source in mathematics, from arithmetic to the calculus, arranged logically and in order of difficulty. Explanations of principles are followed by worked examples.

This one-volume math "library" economizes not only your money but, more important, your time. Amazingly, the author, with a rare talent for simplifying the complicated, covers the whole gamut: treatment of fractions, decimals, square root and cube root, logarithms, progression overages, interest, algebra, equations, graphs, plane and solid geometry, trigonometry, differential and integral calculus, useful mathematical tables; summary of mathematical formulas, etc., etc.

This remarkable work which already has aided thousands, will be of enormous help not only to those who have forgotten their mathematics but also to those now acquiring it. You may try it out at our risk. ORDER NOW:

**A REFRESHER COURSE IN MATHEMATICS**

by F. J. Cunn

240 Pages • 195 Illustrations  
2.95 Postfree • 10-Day Money-Back Guarantee  
EMERSON BOOKS, Inc., Dept. 623-L  
251 W. 19th Street, New York 11

## Kodak reports on:

a film that separates the lemons from the oranges . . . a device with enormous potentialities for inventiveness . . . the advantage of rising above a subject

### Process E-3

Distinguished by the designation "(Process E-3)" from earlier versions, a new Kodak Ektachrome Film is aimed to please the worker who is pretty all-fired sure that for any trifling deficiency in his color transparencies the fault has lain not in himself, not in his technique, not in his equipment, but in his film.

Beyond the shadow of an illusion, this film is *sharper* than its predecessors. *Sharpness* differs from contrast and from resolving power. It represents ability to render a boundary—within how few microns the color on the transparency can change from (let us say) a certain yellow to a certain orange. This ability does not readily lend itself to quantitative statement.

We mention yellow and orange advisedly. A classic challenge to any color photographic process has been to distinguish between the hue of lemons and oranges in one bowl of fruit. The new film meets it handily. Greens are better, too.

More valuable to some users will be the fidelity of the new film to the visual appearance of such photographically elusive biological stains as eosin and fuchsin. The photomicrographer now gets not only an enhancement of the fine color discrimination for which *Ektachrome* was notable even before but a new advantage in speed. Exposure Index is 32 for the *Type B* (which requires only heat-absorbing and possibly U-V filters in the usual photomicrographic setups) and 50 for the *Daylight Type* (used with electronic flash). Statistics show that in 1/25 second you get only 20% of the vibration contained in 1/5 second.

Kodak dealers now stock the new Kodak Ektachrome Film (Process E-3) in the usual sheet-film sizes. For 120 and 620 roll-film cameras it's called Kodak Ektachrome Professional Film, Daylight Type (Process E-3). They also carry various-sized kits of the new processing chemicals that Process E-3 requires. The processing cycle takes about an hour.

If a) you want paper prints and duplicate transparencies, and if b) you want to be able to manipulate your color balance toward a conception of reality transcending what can be built into inanimate film, and if c) you are willing to process both a negative and a positive before you judge your results, don't even bother with this new stuff. Stick to Kodak Ektacolor Film and Paper.

### They transduce



We make Kodak Ektron Detectors like these for transducing a visible or infrared pattern into electrical terms. The darker material is photoconductive lead sulfide or lead selenide; the electrodes (actually evaporated gold) appear grey here. Since we can lay down the photosensitive material in any configuration, enormous potentialities for inventiveness present themselves. Whether you seize them is entirely up to you. We offer a pamphlet,

"Kodak Ektron Detectors." You get it by writing Eastman Kodak Company, Special Products Division, Rochester 4, N. Y. It describes what spectral sensitivities and time constants can be selected and very, very briefly summarizes the circuitry considerations—a little rough, perhaps, for persons with casual interest in this sort of thing. It does tell enough to place an order for breadboarding purposes or a request for quotation.

### Geologists as larks

In Washington last spring, at the annual meeting of the American Society of Photogrammetry, the photogeologists were there with bells on, giving papers and happy as larks.

The higher you fly, said one, the quicker and clearer the big picture comes through of structural trends, stream alignments (such as might reflect fracturing in the bedrock, either jointing or shearing), topographic anomalies. The lower you fly, said another, the more subtle color differentiation you can pick up unblurred with the new high speed aerial color films (which we happen to make), and the easier, then, to follow across the miles the contact of various stratigraphic formations with each other and with alluvial and slope-wash deposits. In flatland areas, said a third, where the evidences for geological analysis are difficult or impossible to obtain, modern exploration for petroleum and minerals demands geomorphological study from aerial photographs.

Do you see the problem? Saddle sores may still mark the field geologist who refuses to jump at conclusions, but his blinders can be struck off by a ride in an airplane mounting a suitable aerial camera in its belly. Does he have to go commercial or government to afford this, or beg for pictures to study? Maybe not. Maybe we can put him in touch with an aerial photographer who wants his modest business. Let him write Eastman Kodak Company, Government Sales Division, Rochester 4, N. Y. And if he wants to read the papers given in Washington, let him send \$1.75 to the American Society of Photogrammetry, 1515 Massachusetts Avenue N.W., Washington 5, D. C., for the September, 1958, issue of its journal.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

**Kodak**  
TRADE MARK



SPANISH (American or European) • FRENCH  
GERMAN • ITALIAN • JAPANESE  
MODERN GREEK • ICELANDIC

Any of 34 languages available at home

Only LINGUAPHONE, The World's Standard Conversational Method, brings 8 to 12 outstanding native language teachers into your home on fine recordings. It's like living in another land. You listen. You hear native men and women converse about up-to-date, every-day matters. You Understand. You SPEAK. Exciting Business, Travel Opportunities Here and Abroad. Linguaphone is used around the world by schools, governments, business firms. Over a million home-study students of all ages.

Stop Wishing—Start Talking! Send for FREE Book and Details of FREE TRIAL. Linguaphone Institute, T-31-039 Radio City, New York 20, N. Y.

## BIND and SAVE Your SNL's



All 52 issues of SNL for a full year can be permanently filed in these sturdy buff-colored, buckram binders

Each issue snaps into the cover with a metal strip. Only \$4.00 complete, Ppd. Order now, from

SCIENCE NEWS LETTER

1719 "N" N.W. Wash. 6, D.C.

## Best Book Contest for 1959

\$1600 Cash Awards plus 40% royalty. All types of manuscripts invited. For Contest rules and details of famous publishing plan, write for free Brochure SN. Pageant Press, 101 Fifth Ave., N. Y. 3

## DEMOGRAPHY

### Seven-Year Baby Boom Slacks Off During 1958

► THE BABY BOOM that began in 1951 in this country is apparently slackening off, according to estimates released by the U. S. Public Health Service.

There has been a steady increase in the number of babies born each year since 1950. But estimates for the past year indicate that births have decreased by one percent, figures from the National Office of Vital Statistics reveal.

There were 4,301,000 babies born in 1957. The expected annual total for 1958 was 4,248,000.

Science News Letter, March 7, 1959

## Questions

ASTRONOMY—What is one name given to a device that photographs stars electronically? p. 147.

ENGINEERING—What standard crop will soon be used for manufacturing paper in Israel? p. 149.

INVENTION—What natural-born experts are being consulted to determine the oil content of land? p. 148.

Photographs: Cover, Fremont Davis; pp. 147 and 151, Massachusetts Institute of Technology; p. 149, Benito Talli; p. 160, Reynolds Metals Company.

## Do You Know

The *aurora borealis*, or northern lights, results when the noble gases, helium, neon, argon, krypton and xenon, are struck by charged particles such as protons or alpha particles; the gases glow as the particles pass through them.

Every year 30,000,000 tons of fish and plants are obtained from the oceans, but experts believe this supply can be greatly increased by improved methods of fishing.

## MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists. 25¢ per word, payable in advance. Closing date 3 weeks prior to publication (Saturday).

SNL, 1719 N St., N.W., Washington 6, D. C.

## BIOLOGICAL STAINS

BIOLOGICAL STAINS. FREE PRICE LIST. ESBE Laboratory Supplies, 459 Bloor St., W., Toronto, Ontario, Canada.

## BOOKS

ROCKET SCIENCE FOR AMATEURS—New Book! Featuring: Zinc-Sulfur Rocket Plans, Theory, Performance. Well-illustrated! \$2.00. Sooner Science, Box 145, Norman, Oklahoma.

## PLASTICS

NEW LIQUID CASTING PLASTIC, CLEAR Colors. Embed real flowers, minerals, biological specimens, delicate instruments, electronic parts. Also cold setting resins and fiberglass for laminating, casting, molding, coating. Manual 25¢. Castolite Company, Dept. CI-30, Woodstock, Illinois.

## AVOID FLAT TIRES!

### Carry Spare Air AUTOMATIC TIRE INFLATOR

Spare Air is no bigger than an ordinary push button can and as easy to use. This revolutionary discovery inflates tires in seconds.

Spare air requires no tools. Just screw it onto tire valve and its action is automatic.

For safety and economy—Save wear and tear on your back and your pocketbook. Use Spare Air.

Spare Air Set, \$2.98

Refills \$1.98 each, tire Gauge \$1.50, Shipping charge 50¢

John Surrey, Ltd. 11 West 32nd St., Dept. SN-97, New York 1, N. Y.

## AMAZING ELECTRONICS DISCOVERY!

### Portable, Transistorized Tape Recorder Costs LESS Than Down Payment on Many Standard Recorders!



Here's the new, low-priced, battery-operated tape recorder you've been waiting for! Powered by ordinary flashlight batteries and transistors—a finely engineered instrument—not a toy! It is multi-staged utilizing transistors for superb tone clarity. Truly portable—weighs less than 2 lbs.

### CAN SAVE YOU MANY TIMES ITS COST THE VERY FIRST TIME YOU USE IT!

You'll find a thousand and one uses for this amazing tape recorder. Use it as a dictating machine—to cut your office and home work in half. Use it to record sales meetings, interviews, group discussions, on the spot reactions wherever you go! Use it for wonderful new fun with your children and family—to store up memories that will never grow dim! It makes the perfect gift to give or get!

**\$37.50** Complete with Microphone-Listening Device, Private Listener, Sample Reel of Tape, Deluxe Fitted Attache Type, Simulated Leather Carrying Case, Set of Batteries  
**FREE!** Extra 225 ft. Reel of Recording Tape!

Scholastic Teacher—"Recording is quite audible and easily understandable. Fine for small student group, interviewing community leaders."

Mademoiselle—"Very happy to report that anyone can afford it—and anyone can operate it!"

V.F.W. Magazine—"Imagine a precision-made, battery-operated tape recorder that weighs only two pounds, yet sells for this amazing low price."

FILNOR PRODUCTS INC., Dept. M-75—101 W. 31st., New York 1, N. Y.

## LET SOME OF AMERICA'S OUTSTANDING PRESTIGE MAGAZINES TELL YOU WHAT THEY THINK ABOUT IT!

American Legion—"While miniature tape recorders have been available for years, their price has kept them out of the mass market. Most of them sell for close to \$300, but now a machine is being sold for one-tenth of that!"

Cosmopolitan—"The Last Word... Capture baby's first words or a memorable family occasion. Dictate letters, reports, speeches. You can even re-record phono discs and radio and TV shows!"

Popular Mechanics—"Provides low cost, variable speed recording and playback."

Send Check or Money Order.  
If COD—send \$3.00 deposit.

# THEY PROBE THE FUTURE OF DEEP-SEA TELEPHONY

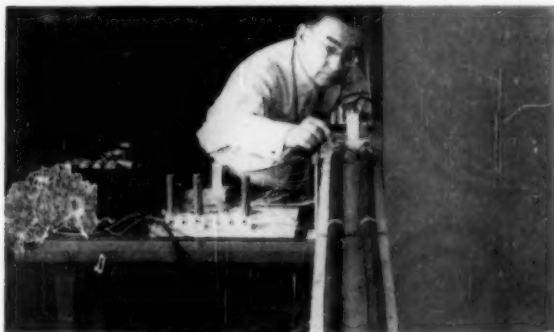


"Dry Land Ocean," under construction at Bell Laboratories, simulates ocean floor conditions, is used to test changes in cable loss. Sample cables are housed in pipes which contain salt water under deep-sea pressure. The completed trough is roofed in and is filled with water which maintains the pipes at 37° F., the temperature of the ocean floor.

Deep in the ocean, a submarine telephone cable system is extremely hard to get at for adjustment or repair. This makes it vitally important to find out what can happen to such a system *before* it is installed.

Bell Laboratories engineers do this by means of tests which simulate ocean floor conditions on dry land. Among many factors they test for are the effects of immense pressures on amplifier housings and their water-resistant seals. They also test for agents which work very slowly, yet can cause serious destruction over the years—chemical action, marine borers and several species of bacteria which strangely thrive under great pressures.

Through this and other work, Bell Telephone Laboratories engineers are learning how to create better deep-sea telephone systems to connect America to the rest of the world.



Highly precise instruments developed by Bell Laboratories engineers are used to detect infinitesimal changes in cable loss—to an accuracy of ten millionths of a decibel.



Seawater and sediment in bottle characterize ocean floor. Test sample of insulation on coiled wire is checked for bacterial attack by conductance and capacitance tests.



**BELL TELEPHONE LABORATORIES**

WORLD CENTER OF COMMUNICATIONS  
RESEARCH AND DEVELOPMENT

# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 977. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **SAWDUST FLOWERPOTS** are claimed to be porous, sterile, virtually unbreakable, impervious to temperature extremes, and mildew-resistant. They are also said to have better insulating properties than conventional clay pots.

Science News Letter, March 7, 1959

❁ **GAS-LIQUID CHROMATOGRAPH**, for separation and analysis of such things as chemicals, foods and biological products, uses an ionization detector system said to maintain stability and reproducibility virtually independent of such variables as temperature, pressure or flow rate.

Science News Letter, March 7, 1959

❁ **PHOTOGRAPHIC PRINTER** automatically brings out maximum detail from each portion of film by using a scanning light beam from a cathode ray tube as a light source. When the exposing spot of light from the tube encounters a dense region on the negative, it instantaneously becomes brighter. The machine is for professional photofinishers.

Science News Letter, March 7, 1959

❁ **PLASTIC VENEER**, resembling hand-rubbed wood, as shown in the photograph, covers steel kitchen cabinet doors, table tops, bars, sinks, and wall panels. It is un-



affected by alcohol, fruit acids, boiling water and common household chemicals.

Science News Letter, March 7, 1959

❁ **MOUNTED TELESCOPE** for professional and amateur astronomers permits instant changeover from visual observation to

astrophotography through use of a camera adapter and pushbutton guide telescope attached to a clock drive. Equipped with three eyepieces, the telescope has a 4 1/4-inch f/11 reflector.

Science News Letter, March 7, 1959

❁ **LARGE DICE**, measuring one and a half inches on a side, are made of heavy, clear red plastic. Complete with white dots, they may be used as knickknacks, paper weights or desk ornaments.

Science News Letter, March 7, 1959

❁ **PAYROLL CALCULATOR** is a system of hinged cards with index tabs having data on wages from 75¢ to \$5. It is said to eliminate the need for all figuring. All one has to do is read and copy precalculated and verified answers as to regular pay, overtime pay and total.

Science News Letter, March 7, 1959

❁ **NYLON HINGE** requires no lubrication yet will not stick or squeak. It can be produced in the color, shape or finish to meet the specific hinge design needed. No pin is required since the mating halves are molded together inseparably. The hinge is said to withstand hammering, immersion in boiling water or corrosive chemicals, and sub-zero temperatures without ill effect.

Science News Letter, March 7, 1959



## Nature Ramblings



By HORACE LOFTIN

➤ A FEW SHORT weeks ago, the dead cypresses rearing their moss-draped forms from the swamps of the St. Marks Wildlife Refuge would have made perfect symbols of emptiness and desolation.

By now these same cypresses will have become transformed into a picture of familial "togetherness," as scores of ospreys, or fish hawks, arrive to set up house for the year.

The return of the ospreys to north Florida is looked upon with a great deal of pleasure, something like the arrival of the first robin up north, or the swallows returning to Capistrano on time. The natives know for sure that killing frosts are over and spring is there to stay when the great nests of twigs and branches begin to appear once more on the barren limbs.

At one spot along the road that winds through the St. Marks refuge, more than 20 nests scattered through the swamps will

### Return of the Osprey



be visible. These represent just a small fraction of the ospreys in the area. The same nesting sites are used year after year.

Sometimes, the returning ospreys have little to do in setting up housekeeping besides making a few minor repairs to the old nests. But in hurricane years, or when winter winds have been severe, the old structures are blown down. Then the big birds must start from scratch with their new homes.

Within a few short weeks, most of these nests will have from two to four young in them. Mother and father osprey take turns on the nest during incubation and after the hatching so that the unoccupied parent can hunt for food on fishing expeditions.

The osprey on the hunt soars over a likely area of water till he spots a surface-swimming fish. In a flash, the osprey changes from reconnaissance plane to dive bomber, dropping with terrific speed and force on the prey.

The hard-working osprey may meet a little trouble as he attempts to take the meal back to the family, for there is a villain in this piece: the bald eagle. So long as there is an osprey around to catch fish for him, the bald eagle is seldom seen to do his own fishing.

He harasses the osprey until it drops its prey. The eagle then swoops immediately down to catch the fish before it hits the water.

Science News Letter, March 7, 1959

